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Original

ELECTRICAL FORCE IN MAN AND NATURE.

BY JOHN J. CALDWELL, M. D., BALTIMORE, MD.

"The wires that pervade ocean, ether and land
Are the chains that bind nations together."

All phenomena of the organic or inorganic world are now being interpreted in terms of matter, motion and force. The pilot idea of the doctrine of evolution to-day is that everything proceeds from the simple to the complex, and that back of all the manifestations of matter and of mind there lies "unity of force." It is this acting, living, persistent principle which constantly sits at the loom of time and arranges the position and the texture of the threads that makes up the web of things. This ancient weaver, called "Force," has received many different names. When it works among molecules we call it cohesive attraction. When it works among the ultimate atoms, building them up into the delicate and beautiful crystals, we call it the crystallizing force. When engaged

in uniting kindred atoms we call it chemical force or chemical affinity. Our meaning, however, is sufficiently indicated without further extension of the list of forces.

Nature delights in prodigality of results, but she is parsimonious in the number of her working powers. Given a little matter and motion, and she will construct a world. The lines of force radiate in all directions, always acting; always persistent. Difference of result is but the product of the same force, differently conditioned. A tree and a mammal exhibit the same parent force. In the ultimate analysis we reach simplicity of cause and "unity of force." Verily, there is "unity in variety and variety in unity." All that science can do, armed and equipped as she now is, if truthful to her

high calling, is to recognize the great fact that back of all the working energies of nature there lies the light of a universal intelligence, so guiding, controlling and compounding the manifold manifestations of "force" as that the final outcome of all shall redound to the best good of the creature and the everlasting glory of the Creator.

We have, thus, in a general way, indicated the essential unity of "force" and the great diversity of its results. But here we must stop. What force is, per se, we know not. We can only watch the play of its untiring activities throughout the realm of nature:

"Mysterious essence, vital Force,
We fain would all thy secrets know;
Would find at last the hidden source,
From whence thy power doth ever flow."

"But ours, alas, is finite sphere;
A larger vision by and bye
Maybe will solve what puzzles here;
Till then on trusting faith rely."

Perhaps one of the most impressive instances of the play of force is to be seen in the phenomena of light. Light is but a result of the rapid oscillations of the ether waves. Hundreds of millions of these waves strike the retina per second before we are conscious of the sensation of light. How this sensation is translated into consciousness is a mode of force of which we know nothing. One fact, however, has been determined; viz., that color is a result of motion. Less rapid oscillations are required to produce in us the sensation of the red in the spectrum than of the violet. Electric light, which is the most intense of all light, is but a product of exalted motion. This can be beautifully illustrated by suspending a rod in a darkened room, with machinery attached, so as to increase its motion at pleasure. A certain degree of motion produces sound; this motion, increased, produces heat; a further increase produces all the colors of the spectrum in their regular order. Still exalting this motion we obtain electric light.

What more beautiful demonstration of the unity, and yet of the diverse action of motion, which is only another name for force. But it were useless to give, in detail, even a tithe of the protean results of this silent and unobtrusive energy.

Force, being persistent, must always act; it must produce results. Harmony in result implies harmony in the conditions under which force is brought to act. Want of harmony in result implies a want of harmonious conditions. Hence, what are called freaks of nature, monstrosities and all forms of diseased action.

The theory of wave motion in the ether had its origin in the wave motion of water and the atmosphere. The ear sustains the same relation to sound that the eye does to light. There is a close analogy between the harmony of sound and the harmony of color. The rhythm of sound has its unvarying conditions in reference to the human ear. Atmospheric vibrations, when they exceed a certain number per second, lose their individuality and become merged into a hum or indistinct sound. The auditory nerve is finely adapted to take in the whole range of the gamut. Sounds, higher or lower, in either direction, cease to be distinct. It matters not from whence we take our illustrations of the "Play of Force," we still find it in the ultimate analysis, persistent and a unit. The harmony of the universe is everywhere apparent. Order, design, adaptation and law are everywhere discernible. Force reigns supreme. Its workings are written in living light throughout the organic and inorganic world. It flashes in the light and glows in all the colors of the spectrum. It proclaims itself in all the harmonies of sound, and in the most complex workings of the brain. Space, boundless, ever-reaching space, is its workshop. And time, never-ending time, is constantly recording its mighty results.

It remains to say a word in reference to the more special manifestations of force. The human system supplies the most appropriate example. From the persistence of force we can but conclude that between the mind and the body there is the

closest relation, sensation, thought; and our most involved sentiments imply the destruction or waste of the gray tissue of the brain molecules. This waste is only another name for one mode of the "Play of Force." In a word, Man, as he is, is but a product of Force, acting in the first instance on a germ hardly microscopic, and mind, with all its wonderful and complicated powers, is evolved from the simplest beginnings. A Raphael or a Newton are evolved, in common with the lowest order of animal life, from the product of the same force, controlled and governed by the same law, which has its fitting conditions and relations. Want of harmony in these, as we before remarked, implies want of harmony in result. A healthy mind, healthy morals and a healthy religion are the resultants of the unimpeded action of force.

A knowledge of the brain and of the network of the nervous system is essential to every educated physician who would minister to a body or to a mind diseased. The ability to maintain a proper medium through the exaltation or depression of nerve power is requisite to him who would understand correctly the nervous system. Her path to universal empire will continue to be, as it is now, dotted all along with rejected theories. She is now making rapid strides, and has indeed become an ocean of truth. Let us keep abreast, at least, of that portion of its mighty tide which is now carrying the science of medicine onward, far onward, beyond its ancient landmarks; enriching it with new truths and ennobling it with new laurels.

Just how electricity acts as a therapeutic agent no experimenter has satisfactorily explained, though learned minds, at home and abroad, have elaborated ingenious erudite theories, simple and complex, still we will maintain our text, "The Unity of Force." We will again note that electricity is but another name for the most exalted motion known to the human intellect. We will then be able, in some degree, to comprehend its action upon our bodies, and its true place in medicine, and how it acts through the brain, and its in-

finite ramifications:

Nerve velocity is sixty yards per second.

Sound velocity is 332 yards per second.

Cannonball velocity is 550 yards per second.

Light velocity is 360,000,000 yards per second.

Electricity velocity is 450,000,000 yards per second.

"With armies of signs I have girdled
the world,

I am felt in the words they indite;
They move on their way with no
banner unfurled,

With a speed that is greater than
light."

Hence it can be readily understood how electricity's direct action may accelerate our natural forces; how its reverse action may depress them; how its chemical action may dissolve or electrolize morbid growth. How we may dilate the vascular system, or accelerate the vaso-motor, and how through the sympathetic system exalt the trophic powers, or produce inhibitory action.

"Man still remains unsatisfied,

Still strives to mend his state;
What! though the months are
changed to days,

When speeds him on his distant
ways,

Impatient, still, at time's delays,

He never learns to wait.

And only when the lightning's
flash

Submissive, owns his power,
And, humble as a cringing slave,
Bridges for him the Atlantic wave,

He rests a single hour;

When Volta's pile and Franklin's
kite,

And Morse and Henry all unite
To give imperial sway."

The attention of electricians was concentrated upon electro-physics until the perfection of the mechanical contrivance by Morse. In due time it was known to the medical profession that electricity was a powerful therapeutical agent, and its application in the treatment of disease wrested from the hands of

quacks and charlatans. Electro-therapy is now an important speciality in medicine. The close analogy of electric to nerve force at once caused attention to be directed to its employment in the treatment of nervous diseases; but experiment has shown that it is applicable to the treatment, the relief and cure of other pathological conditions. Thus it may be used as a tonic in cases of nervous debility, in cases of paralysis, so as to take the place of nerve force which presides of functions of nutrition. The nutrition of the paralysed limb is thus sustained, and likewise the revival of nervous energy promoted. It is apparent from the close analogy of electricity to nerve force that this agent embraces a wide range of morbid conditions. Through the nervous cords, which act as conductors, every part of the animal organism can be reached. In this way secretion and elimination of morbid products may be promoted, and the organ or apparatus restored to healthy action. The three great forces of nature are heat, light and electricity. These are the forces under whose influence vegetation is produced. Heat and moisture cause the germ of life in seed to awaken, the materials stored up for the use of the embryo undergo changes both chemical and mechanical, so as to be fit for appropriation. The architecture of the plant begins. A spine shoots up from the bud, under the influence of the sun's light, the food afforded by the atmosphere is appropriated. Forces are active at the root, forces are active in the blade. There is no doubt in my opinion that electricity is one of the active forces which contributes to plant growth. We have all the conditions of its generation—heat, moisture, unequal heating of different mineral substances, causing thermo-electricity. We also have chemical action. It is impossible to draw a line of demarcation between vegetable and animal structure, and doubt not that heat, light and electricity are the physical forces under which animal structure is built up. The light of the sun is as necessary to the vigor and health of the animal as of the vegetable kingdom. Indeed, as al-

ready stated, the two shade into each other so as to render it impossible to say where the vegetable ceases and the animal begins. Electricity, being one of the forces which contributes to the animal organism, is necessary to functional health.

The various conditions under which electricity is manifested enable us to apply it to a variety of morbid conditions. Its wonderful decomposing power (electrolysis) has been utilized by the physician. The intense heat incident to its manifestation by certain combinations has enabled the surgeon to substitute in many cases the cautery for the knife, indeed, to apply it to the section of morbid growths not remedial by the knife.

It may be stated, in order that progress shall be had in any branch of science, appropriate apparatus is necessary. Scientific speculation is a great lever, but it must be controlled by experiment, speculation must be tested by experiment, for the human mind is too apt to be seduced by the pleasures of speculative philosophy, and too prone to abandon the paths of observation and sound induction.

From the want of apparatus and the ignorance of its different modes of manifestation, electricity as a therapeutic agent was seized upon by the charlatan and neglected by intelligent practitioners of medicine. By a curious coincidence the discoveries in electric science and improved apparatus were accompanied by great discoveries in regard to the functions of the nervous system. Whilst Oersted, Ampeere, Faraday and others were making rapid strides in electric science, Sir Charles Bell, Mayendie, Marshall Hall, Claude Bernard, Brown-Sequard and others were unraveling the intricacies of the nervous system. In no era of the world has there ever been such activity in scientific investigations and the applications of science to the material comfort and welfare of mankind.

At last, the votaries of medicine contribute their quota, and many of the most eminent of the profession are devoting their talents and energies to the therapeutical effects of

electric force in the treatment of disease.

We have been induced to try the effects of electricity in cases of suspended vital function, resulting from narcosis, and cases of apparent death from drowning, from experiment upon living rabbits, made by Dr. Wilson Phillips, of England, from which it appears that electric force was used to substitute nerve power. The pneumogastric nerve of the animal was severed immediately after it had eaten some parsley. After the death of the animal, which had great difficulty of breathing, and perished apparently from suffocation, the

stomach was opened and the parsley found undigested. A similar experiment of section of pneumogastric nerve was made, but a current of galvanism passed along the nerve, and continued for twenty-six hours. No difficulty of breathing occurred as long as the current was kept up. The animal was killed, the stomach examined, the parsley was completely digested. It thus appeared that galvanic energy is capable of supplying nervous influence in that the process of digestion may be carried on. Similar experiments were made upon dogs with like results.

NOTES ON SOME OF THE CLINICAL FEATURES OF TUMORS,
THEIR ANATOMICAL CHARACTERS, MORPHOLOGICAL ELEMENTS AND THEIR THERAPY, BY TENTATIVE, CONSTITUTIONAL OR RADICAL MEASURES.

BY THOMAS H. MANLEY, M. D.
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THORACIC TUMORS.

(Continued)

THORACIC TUMORS—THOSE ON ITS DORSAL ASPECT OF AN INFLAMMATORY CHARACTER.

All tumors, wherever situate, contain many elements of inflammatory hyperplasia. These are incidental to the evolution of the growth.

Carbuncle is made up entirely of the products of inflammations, plus the most virulent bacteria of suppuration and gangrene, the streptococci and the bacterium-termo.

These can be "nipped in the bud," so to speak, wherever they spring from, every time with ease, safety and security, without any mutilating procedure, without the aid of anesthetics, without any sufferings or shock to the system.

Oh, that the time had come when

the same might be said of the dread epithelial ingrowth of cancer, or the empyemic changes of sarcoma.

TREATMENT OF THE INTEGUMENT.

The means for destroying carbuncle in any of its stages are by mummification of the growth with aid of liquified, pure carbolic acid.

One begins by cleansing the cutaneous surface and spraying it well with ether.

HYPODERMICATIVE OR INTRA-PARENCHYMATOUS INJECTION.

Now we charge a hypodermic syringe with the warm dissolved crystals of carbolic acid, or, if heating be not expedient, a saturated solution will suffice. If the tumor be yet small, of the incipient, papillary variety, we inject well into its base one, two or three drops.

It is injected slowly. In a moment we will see the residue of the acid make its way out through the papilla; but one injection will usually suffice in this type, at this stage. When the tumor has considerably enlarged and is suppurating and has several openings we may not only enlarge the dose, but likewise augment the number of injections. In a massive fungating carbuncle on the back of the wife of a physician this last spring I found it necessary to make four punctures and inject 40 drops of the acid.

In all cases the effects are most extraordinary, the phenic acid at once and permanently annuls the agonizing pain, the violent throbbing ceases, the patient moves about with freedom, appetite and sleep return. The transformation is indeed extraordinary. As a prominent physician of New York, who was my patient this spring, remarked, that one like him, who had been cut under the older method, could best appreciate the marvelous potency of this simple method.

CONSECUTIVE TREATMENT.

All these patients need bark, quinine and iron, preceded by a mild mercurial purge.

As for the carbuncle itself, in the average case there is little to do after injection.

Tumefaction disappears, the core hardens, becomes detached and thrown off, when we have a simple ulcer to treat on general principles.

The theoretical objections against this method are without support. There is no danger of systemic toxemia, because the pungent acid at once unites with the albuminous elements, the pus and blood, promptly destroys all germs and leaves a painless eschar.

MAMMARY TUMORS.

These will be considered later under the general head of primary neoplasmata, though no attempt can be made to give them the detailed consideration found in special treatises published on the subject.

MISCELLANEOUS TUMORS OVER THE THORACIC WALLS.

I have met with a few rather unusual types of tumors over the anterior and lateral chest walls. In one young woman and in a middle-aged man I have found incased under the pectoralis major—right side in both—large, rather flattened tumors with many features simulating cysts, which on dissection proved to be lipomata.

A young man came under my care three years ago with about all the grosser signs of an axillary aneurism. A consultant verified my diagnosis. He went to a Homeopathic physician, who told him he had no aneurism, and, sure enough, when I examined him some six weeks later every trace of it had disappeared. It was purely an aneurotic manifestation of the vaso-motor nerves, with cardiopathic disturbance.

From one case, a young woman, I removed an axillary growth the size of an orange, which proved to be a dermoid cyst.

Two years ago I dissected away an extensive primary keloid mass from the subclavicular region of a middle-aged man, who gave no history of trauma.

ENCEPHALITIC AND LATE EPILEPSY.

BY JAS. G. KIERNAN, M. D., Chicago, Ill.

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Epilepsy occurring after 25 and that due to encephalitis have points of special interest in common. Epilepsy following on the various forms of infantile encephalitis exhibits in my experience many peculiarities. It is more apt to be accompanied by trophic phenomena of the extremities varying from the simple "dead fingers" to phenomena nearly approximating Raynaud's disease. It reacts badly to the bromides. Mental symptoms, fits of temper, of sullenness, of depression, or even destructiveness, replace under the bromides the convulsive attacks. The tendency to impairment of the circulatory innervation of the extremities is increased. The various bromic dermatoses appear with comparatively great frequency. In not a few instances, these eruptions have proven unduly severe and protracted. A nocturnal mental type takes the place often of the convulsion. It is attended by phenomena closely resembling those of somnambulism. In some few instances an intense pruritus results. While the dermic phenomena due to the bromides yield to arsenic, calcium sulphide, etc., still these ameliorations are very temporary, and the original phenomena recur after a time. As Spitzka has pointed out, epilepsy is a diseased state of the encephalon without a palpable characteristic lesion, manifesting itself in explosive activity of an unduly irritable vaso-motor centre, leading to complete or partial loss of consciousness which may be preceded or followed by various phenomena expressing the undue preponderance of some and the suspended inhibitory influence of other cerebral districts. The patho-anatomical changes found in patients suffering from this disease throw but little light on pathological physiology. Certain vascular phenomena accompany an epileptic attack so constantly that they

have been considered the fundamental essential factor of epilepsy. Suddenly produced anemia of the higher nerve centres will, it is true, produce convulsions. But it does not follow that the arterial spasm is the direct cause of the epileptic fit. The convulsion, while a phenomena of the fit, is neither an initial nor is it as constant as it should be were the Kussmaul-Tenner theory correct.

Nor does the discharging lesion theory of Hughlings-Jackson explain the phenomena of epilepsy. That an irritive lesion of different portions of the brain may result in epileptiform explosions is no proof that the idiopathic epileptic attack has a similar origin and is due to similarly located foci of impalpable disease. Take an inflammatory softening on or near the cortical area which stands in a relation to the muscle of the arm; epileptiform spasms may be a symptom of such a lesion and they may begin in the particular muscle whose "centre" is affected, they may then extend to the other muscles of that half of the body or suddenly to the entire voluntary muscular system. Is that proof that the epileptic "discharge has extended through the cortex by irradiations?" It does not seem that this could be maintained in cases where the transition from the localized, or, as it were, "focal" spasm to the general convulsion was sudden. It seems more probable that the primary irritation has determined a secondary irritability of the great convulsive centre of the body, namely, the reticular gray matter of the brain isthmus, particularly of the pons and medulla. Starting with the fact that all characteristic features of the full epileptic onset can be produced in animals, deprived of their cerebral hemispheres working, a satisfactory hypothesis of the nature of epilepsy can be obtained. It needs

but a slight puncture with a thin needle to produce typical convulsions in the rabbit and some of the convulsive movements reported by Nothnagel have not only shown the true epileptic character, but also that peculiar automatism noted in aberrant attacks. It is in this segment of the nervous system that all the great nerve strands conveying motor impulses, both of a voluntary and automatic and some of a reflex character, are found united in a relatively small area, and just here a relatively slight disturbance might produce functional disturbances involving the entire bodily periphery.

The experiments of physiologists have shown that if a sensory irritation of a given spinal nucleus be kept up, after having produced a reflex movement in the same segment, if there is any reaction beyond the plane of that segment at all it is not in the next or succeeding plans, but in the medulla oblongata. The motor reaction then manifests itself in laughing, crying or deglutitory spasms and, if the irritation be of the severest kind, epileptic or tetanic spasms in addition. Now the occurrence of laughing, crying or deglutitory spasms could be easily understood if the molecular oscillation induced by the irritation were to travel along the associating tracts from the given spinal segment to the nuclei of the medulla oblongata. For in the medulla there are found the nerve nuclei which preside over the facial, laryngeal and pharyngeal muscles. It is not easy at first to understand how tetanus and epilepsy, that is, spasms consisting in movements whose direct projection is not in the medulla oblongata, but in the cord, can be produced by irritation of the former.

There are scattered groups of nerve cells in the medulla oblongata which have either no demonstrable connection with the nerve nuclei or are positively known to be connected with the longitudinal associating strands. These cells hence can safely be regarded as representing a presiding centre over the entire spinal system. No spinal centre exerts any influence even remotely, as pronounced as that of the entire cord. This

applies to man and other mammals. That the elaboration of the medullary centre was as gradual a process as that of other higher differentiations is illustrated by the case of the frog whose medulla has acquired the faculty of reproducing general spasms while the spinal cord itself retains this property also; hence here the predominance of the medulla is not so marked as in mammals.

The reticular ganglion of the oblongata is not in the adult a part of the central tubular gray matter, but has, through originally developing from it in the embryo, become ultimately isolated from its mother bed. It constitutes a second ganglionic category, and the association fibres bringing it in functional union with the spinal gray (first category) in lower animals and shown to have assumed the position of projection fibers in the higher to constitute a second projection tract; both together are a second projection system. The scattered gray matter of the medulla has an (inferentially) great importance. Anatomically it is (though its cells be scattered diffusely as a rule) a large ganglion with numerous multipolar cells of all sizes, many of them of gigantic size, sometimes exceeding the so-called motor cells (which they simulate in shape) of the lumbar enlargement in size. Scattered in the "reticular substance" of the medulla from the upper end of the fourth ventricle to the pyramidal decussation they merit the collective designation of reticular ganglia.

The cells of the reticular formation are known to be connected with the nerve nuclei on the one hand, and with longitudinal fasciculi which since they run into cord, terminate either in the gray matter (or the nerve roots directly) for nerve fibres do not terminate with, as it were, blind ends. Now in the mammalian brain the reticular ganglion lies scattered among fibre which come from the higher centres and the interpellation might be made, whether, after all, the reticular ganglion be not a mere intercalary station for fibres derived from a higher source. That originally the ganglion was an independent station there can be no rea-

sonable doubt, for in reptiles this body of cells is too considerable to account for a termination in them of the few cerebral fibres possessed by these animals. And on the other hand, the vertical strands are notably increased in their passage through the field of the medulla oblongata.

The medulla oblongata with its reticular ganglion seems to be the great rhythmical centre. In fish, the movements of the operculum and mouth, in sharks those of the spiraculum; in perenni-branchiate amphibians, the branchial tree, in the infant the suetorial muscles, in all vertebrates the movements of deglutition, of the heart and respiratory muscles, all movements presenting a more or less regular rhythm, are under the control of the medulla oblongata. The early differentiation of the part of the cerebro-spinal axis is without doubt related to the early manifestations of rhythmical movements in the embryo and their predominant importance in lower animals. The possibility should not be excluded that a rhythmic movement may be spinal, nay, even controlled by peripheral ganglia (heart of embryo). A higher development, however, implies the concentration of rhythmic innervations at some point where that anatomical association may be effected, which is the expression of the mutual influence these movements exercise among themselves.

Two sets of phenomena need be borne in mind in studying the physiological pathology of the epileptic attack. First, the condition of the epileptic in the interval. Second, the explosion itself. Too much attention is paid to the last, too little attention to the first. The constitutional epileptic is characterized by a general deficiency of tonus associated with exaggerated reaction and irritability. Thus the pupils are at once widely dilated and unusually mobile. The muscular system, though generally relaxed, manifests exaggerated reflex excitability. The mental state is characterized at once by great indifference and undue irascibility. In the same way the vascular system is depressed in tone in the

interval with rapid marked changes under excitation. The state of the nervous system, as a whole, Spitzka forcibly compares to that of an elastic band, which, being on the stretch continually, is apt to overshoot its mark when one end is let go. Under normal circumstances the band is less stretched and hence not as liable to fly so far when the check is removed.

An irritation, which, in health, produces restlessness of the muscular system, accelerated respiration and pulsation, and various mental phenomena within the normal limits, in the epileptic results in more intense phenomena in the same direction. The nervous irritability of the epileptic manifests itself in one direction especially. An important vaso-motor centre for the brain vessels exists, possibly diffused through an area somewhere between the thalamus and subthalamus above and the pyramidal decussation below. The irritability of this centre results in the sudden arterial spasm in the carotid distribution (so characteristic a feature of the fit onset); simultaneously with the contraction of the vessel, the pupil undergoes an initial contraction, and relaxation instantly results in both cases. The sudden interference with the brain circulation produces unconsciousness, and destroys the checking influence of the higher centres on the reflexes in a manner analogous to any shock affecting the nerve centres. In the meantime, while there has been a sudden deprivation of arterial blood and a sinking of intracranial pressure so far as the great cerebral masses are concerned there has been as sudden an influx of blood to the unaffected district of the vertebral arteries whose irrigation territory is now the seat of an arterial hyperemia. The result of this is that the great convulsion centre, the medulla, being overnourished, functional excess, that is, convulsion, occurs unchecked by the cerebral hemispheres which are disabled by their nutritive shock. The unconsciousness and coma of epilepsy more resemble shock than they do cerebral anemia or syncope. The impeded return circulation of venous blood now

comes into play. The contraction of the neck muscles explains this obstruction and the accumulation of venous blood in the cerebral capillaries of the medulla especially. Meynert's opinion, that this venous blood by the formation of cyanide-like substances acts as a toxic agent and produces the severer symptoms noted during the post-convulsive period, has been recently supported by the finding of convulsant urine toxins by Fere.

In addition to those sustaining the "rubber-band" analogy, the following facts tend to demonstrate the view just expressed. First (a) the contraction of the retinal artery; (b) the initial and very brief contraction of the ordinarily dilated pupils; (c) the sudden pallor of the countenance. Second, (a) the secondary expansion of the retinal arteries; (b) the secondary dilation of the pupils; (c) the secondary flushing of the face. Third, the post-mortem appearances found in those dying immediately after the severe convulsive seizures.

True epilepsy presents an enormous number of sub-groups, exhibiting every variety of deviation from the ideal convulsive form, and the existence of these forms tends to demonstrate the views just expressed. In ordinary petit mal the initial arterial spasm has but to be confined to the surface of the hemispheres, leaving the thalamus ganglia undisturbed, and it can readily be understood how the momentary unconsciousness or abolition of cortical function can occur without the patient falling, his automatic ganglia still carrying on their functions. At the same time with the lesser spasm there would be a less extensive sinking of intracranial pressure and less consecutive collateral hyperemia of the lower centres, and therefore no convulsion.

As Meynert has suggested, in certain cases the arterial spasm may fail to affect the entire cortical surface simultaneously, some one trunk may be more pervious and as afflux of blood may occur in its special field where certain impressions and motor interventions are stored; the result will then be that the function of the relatively well nourished ter-

ritory will be exalted. If it be a visual perception territory, sights, colors of luminous spectra will be seen; if it be an olfactory territory, odors will be smelt; if a tectile centre, crawling, tingling and cold sensation; if a speech centre, cries, phrases and songs may be observed. This explains the manifold epileptic aura, which is simply an isolated, exaggerated limited cortical function. The recurrence of the aura is readily explicable on the ground of the well-known physiological law, that any nervous process, morbid or normal, having run through certain paths, those paths will be the paths of least resistance for that process to follow in the future. To an extension of the same conditions are due the peculiar convulsive, equivalent, and post-epileptic mental states.

Encephalitic epilepsy, while in many cases possibly Jacksonian at the outset, but too often becomes an epileptic constitution, with all the phenomena of idiopathic epilepsy underlain by the pathology just enunciated.

After the age of 25, and most frequently between 35 and 40, in persons with no very decided neurotic heredity, and in most of whom lues can be excluded, occurs an epilepsy which resembles in many respects the epilepsy from encephalitis. As a rule, in these cases, which I have found equally divided as to sex, there has been a precedent period of nervous exhaustion, attended by vertiginous states as its later development.

These vertiginous states are often preceded or followed by anomalous sensory disturbances, frequently compared by the patient to "waves." They pass into states attended by loss of or dazed consciousness, with or without motor explosions. Some of these vertiginous states, even when with consciousness are attended by localized jerking of groups of muscles.

All these phenomena are clearly due to toxic resultant on nerve exhaustions, which produce the effect that Meynert long ago showed was due to them in ordinary epilepsy. Under normal circumstances, the toxins and ptomaines which are pro-

duced in the organism are eliminated by various channels. Some of these products are transformed in the alimentary canal into innocuous substances; gases are eliminated by the lungs; other compounds are intercepted and decomposed in the liver; lastly, certain effete products are eliminated by the kidneys and skin. When any of these emunctories is interfered with in the discharge of its functions the phenomena of auto-intoxication make their appearance. This is observed in certain affections of the alimentary system, for example, which are attended by such symptoms as headache, pallor, hypochondriasis, etc. These manifestations, which are the result of a chronic auto-intoxication, were not improperly attributed by the older writers to disturbance of the hepatic functions. As Schopfer* has lately shown, the liver, by its peculiar intrinsic action, due to the specific activity of its cellules, can diminish the toxic power of the alkaloids with which it is brought into contact. Such action is manifested, not only in the case of poisons introduced through various channels into the organism, but also in the case of poisons elaborated internally within the organism itself in consequence of putrefactions of the products, due to the activity of the tissues. He hence advises intestinal disinfections and special alimentation, so as to obviate or to minimize "auto-intoxication in all maladies in which the liver does not perform its functions normally." One therapeutic great element in preventing the recurrence which constitutes the "epileptic habit" is hence diet. As a rule, the epileptic should be limited chiefly to a farinaceous diet. This should be varied in itself, and by slight amounts of the more digestible meats, beef or mutton. Berries or small seed, fruit, pineapples, bananas, parsnips and turnips should not be eaten and the amount of potatoes should be limited. Large quantities of water should be drunk. In this way the necessity for artificial intestinal antiseptics will be greatly limited.

As Dr. J. M. Soniat, of New Or-

leans, remarks: "Recent biochemical researches, by revealing the action of toxins, ptomaines and leucomaines, have thrown much light on the action of a class of remedies which the older therapeutics called alteratives, which Headland, however, denominates catalytics. This class of remedies, as Headland points out, has the following action: They act in the blood, and their effect is permanent. Each of itself tends to work out a peculiar operation in the blood. The diseases in which they are used depend on certain morbid materials or actions in the blood. The result of the action of a catalytic medicine is in some way to neutralize or counteract some one or more of these morbid processes. These medicines are all unnatural to the blood and must at length pass out of the system. These properties indicate their use in incipient sclerotic states. The recent developments of biochemistry and bacteriology demonstrate that organic compounds produced by bacteria and by metabolism are the origin of secondary pathological tissue change. Scleroses of all types may result from such action. Behind many forms of cirrhosis, renal, hepatic or gastric, is the ptomaine of syphilis.

The foremost metallic alteratives are arsenic, gold and mercury. Gold is an old remedy, but early in the seventies came into prominence because of its affinity for nerve tissue when used as a stain in preparation of microscopical sections. These remedies were found to act best in combination with chlorine, iodine and bromine, while all of these last had an alterative action. Chlorine and iodine were long the chief favorites. Bromine widely used in neuroses attracted less attention as an alterative, although when first discovered it was chiefly so used. Dr. James S. Jewell,* who incidentally noticed through its employment in neuroses that bromine seemed to have a specific action on the formation of connective tissue, remarks:

"Some years ago I called attention to a class of cases in which there was chronic diarrhea, or a tendency to-

*American Medico-Surgical Bulletin, 1894.

*Chicago Medical Review, Vol. 4.

ward looseness of the bowels, more or less gastric catarrh, sallow skin, but clear conjunctiva, gastric uneasiness, habitual deficiency or absence of bile from the bowel discharges and clearly evident (from palpation and percussion) hepatic contraction. In these cases there is actual hepatic atrophy. In them the persistent use of bromine internally has had good results. Its action is slow and it must be continued for months to be of permanent benefit. The bromine is given in distilled water, ten drops of the liquid bromine to the ounce of water. Five drops of this solution should be given thrice daily to begin with. The dose should be increased one drop daily until it is plain the stomach will no longer tolerate a large dose. If the stomach becomes irritable, as a result of the remedy, it may be desirable to reduce the dose to one or two drops, or even cease its use altogether for a time, to resume when the stomach will tolerate it again. It should be given in a considerable quantity of water, as it is likely to irritate the stomach otherwise. Under the use of bromine I have usually seen after a time less disturbances in the gastric zones, less diarrhea, a reappearance of bile in the discharge from the bowels and a slow but decided improvement in the patient's general health.

The alteratives are hence peculiarly suited for treatment of states due to toxin, even antecedent to sclerosis. By destruction of the toxin through stimulus of hepatic action and elimination, they tend to prevent its accumulation and the phenomena resultant on this. The alkaline bromides do not seem to exert this influence, hence in no small degree their untoward effects. Of late metallic bromides have been (it is claimed) united in two compounds, the liquor arsen. auri, Barclay; (arsenauro), and liquor arsen. auri et. hydrarg., Barclay (mercauro). These

two compounds alternated weekly give in the types of epilepsy to which allusion has been made undeniably excellent results. Twenty drops in four doses daily are given, gradually increased by two drops daily until slight sialorrhoea or looseness of the bowels occurs, when the dose is reduced by two drops. None of the untoward effects of the bromides have been observed. Cases stupefied by them have reacted excellently. Like all beneficial effects of alteratives, improvement is at first slight, but increases in geometrical progression.

Of course, certain symptoms require special treatment, and an excellent adjuvant to dietetics and the alterative treatment is nitro-glycerin, which a little less than two decades ago, acting on basis of the morbid phenomena described, was introduced on therapeutical grounds without reference to bromide untoward effects. It was found by neurologists that it had neither the tendency to produce mental symptoms by suppression of the epileptic discharge, nor yet the distressing dermic phenomena. Spitzka found it of especial value, given at shorter intervals than the bromides, in 1-50 grain doses. Trussewitch points out that it should be used when there is a defect in the equilibrium of the vascular tone and the blood is irregularly distributed. It causes a rush of blood to the anemic district or unloads the hyperemic. He finds, as did Spitzka, that after a time there comes a toleration of the drug. It should then be dropped for one or two weeks, when susceptibility will be regained. Osler finds that the physiological effects must be apparent before good results are obtainable. It controls, given on the principles indicated, the restlessness, the temper, as well as the motor phenomena of these epileptics. It is best given eight times daily in 1-250 grain doses.





Editorial

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THE MECHANISM PRODUCING THE FIRST SOUND OF THE HEART.

Sir Richard Quain, in a paper read before the Royal Society of London, June 3, 1897, has attempted to disprove the theories commonly credited as the correct causation of the production of the first sound of the heart as the closure of the auriculo-ventricular valves. The drift of the discussion, as it appears in the *Lancet* for June 19, is somewhat as follows:

Sir Richard Quain, after referring to the doubt existing as to the cause of the first sound, continued:

It seems to me to be desirable, amidst such differences of opinion, to solve a problem which has its special interest and its special importance. Two of the most striking events which take place during systole—namely, the closure of the auriculo-ventricular valves and the

muscular contraction of the ventricular walls—are regarded by many authorities as the sources whence the first sound proceeds. The result of my investigations, on the one hand, leads me to the conclusion that neither of these explanations is satisfactory, and, on the other hand, enables me to indicate what I believe to be the real explanation of the phenomena.

A. The action of the auriculo-ventricular valves is not the source of the first sound of the heart. The mechanism of these valves (the mitral and the tricuspid) and their action do not possess the elements necessary for the production of such a sound.

Sir Richard Quain here gave an account of the action of the valves and proceeded:

Further evidence on this point may be found in another direction, namely, in the fact that the first sound can be heard independently of the existence and action of mitral and tricuspid valves. Aware of the fact that in some of the lower animals, more especially in the reptile class, the auriculo-ventricular valves exist in but a very rudimentary form, I obtained permission to examine some of these creatures in the Zoological Gardens, and spent many hours on many occasions in the investigation, assisted by my valued friend, Dr. John Sibbald.

Sir Richard Quain then referred to the first sound being audible in the python and the kangaroo—which have only rudimentary auriculo-ventricular valves.

Objections will no doubt suggest themselves to the view above expressed. For example, the clinical physician will say, "I am in the daily habit of hearing a distinct murmur accompanying the systole in cases of diseased heart, and apparently replacing the first sound. On examining the heart after death I find the auriculo-ventricular valves diseased—a condition which I therefore connect with the murmur." It will at once be seen that we have here to deal with morbid sounds, totally different in character and totally different in the seat and mode of production, from the first sound of the heart. To make the explanation more simple I will confine my observations to two principal forms of mitral disease associated with systolic murmur—namely, first, imperfection in structure with distinct regurgitation, and, secondly, induration, roughness and irregularities on the mitral valve.

Sir R. Quain described (a) the mitral regurgitant murmur and (b) the systolic murmur without regurgitation. He continued:

These murmurs, striking and characteristic as they are, are merely accidental complications which occur at the moment of the systole of the heart, but they are unconnected with, and have no relation except in point of time to, the healthy first sound, which may be heard apart from and independently of them.

The weight of evidence, then, is clearly against the possibility of the structure or the functions of the auriculo-ventricular valves being the source whence proceeds the first sound of the heart.

Two other phenomena occur synchronously with the systole of the heart, and consequently with the occurrence of the first sound. They are (a) the contraction of the muscular walls of the ventricles, and (b) the propulsion and movement of the blood from the ventricles into the arteries. I shall first consider the supposed share which muscular contraction has in the formation of the sound.

B. The muscular contraction of the walls of the heart during systole is not the source of the first sound of the heart.—The sound produced by muscle during its contraction was first described by Dr. Wollaston. He compared it to "a sound which resembles most nearly that of carriages at a very great distance passing rapidly over a rough pavement." It is very difficult to conceive the slight, soft, rolling sound produced by muscles in action being convertible into a loud, booming first sound of the heart. Yet the theory is accepted. If muscle during contraction could produce so marked a sound we should expect to find that the powerful muscles of the neck attached to the base of the skull and those attached to the jaw (being through the bones of the skull in direct relation with the hearing apparatus) would give us some striking evidence of the production of muscular sounds when they are thrown into strong action. But there is nothing of the kind.

Experiments have been employed to show that the contraction of the muscle is a source of the sound. Hurthle and Einthoven show graphically that the first sound begins with the very beginning of the systole, before the ventricle has got power "to open the valves." This observation is entirely consistent with the view I am about to propose. The moment the ventricle begins to contract the impact of the blood against the semilunar valves commences, producing the commence-

ment of the sound, not when the valves are thrown open. The valves being connected with the fibroid ring surrounding the base of the heart, with which also the muscular walls are continuous, the sounds are conducted to the apex. Pathology confirms this view. It was observed by Dr. Stokes that in the course of typhus fever the first sound of the heart gradually disappears. After death it is found that the walls of the heart are softened, and this morbid state has been accepted as a proof that muscular contraction is the cause of the first sound. The real explanation is that the impulse of the heart is so feeble that it is unable to produce the sound at the valves. The correctness of this view is confirmed by the fact, recorded by Dr. Stokes, that the last point at which the sound disappears is over these valves, and that it is at the same point that the returning sound is first heard.

With the object in view of further investigating this subject I requested my friend, Dr. Alexander Morison, to study the heart of a turtle, recently killed, by holding it close to the ear as one holds a watch when testing for deafness, and also by pressing it gently against the ear. With this intention I gave him an introduction to the proprietors of the "Ship and Turtle" tavern, where he had the fullest opportunity of carrying out the investigation. Dr. Morison writes to me: "An opportunity was afforded me of examining the hearts of two large turtles immediately after they were killed. The heart removed from the body was easily provoked into active contraction by a gentle tap with the finger, the contraction being sufficient to expel blood from the cardiac cavity. On placing the ear close to the heart whilst thus contracting no sound could be heard; on placing the ear lightly on the heart whilst contracting no sound could be heard. So far, therefore, as a turtle's heart is concerned—no other that I know of has more vigor of contraction after removal from the body—muscular contraction as a cause of cardiac sound must be excluded." These facts and observations are, in my opinion, sufficient to prove that the

contractile action of the muscles of the heart is not capable of producing the first sound of the heart.

Having thus endeavored to show that the cause of the first sound is independent alike of auriculo-ventricular action and of muscular contraction of the walls of the heart, I proceed to consider a third event, the most striking and important of all those which occur during the systole of the heart—that is, the propulsion of the blood contained in the ventricles into the pulmonary artery and the aorta, and herein to indicate what seems to me to be the agency by which the sound is produced.

C. The first sound of the heart is caused by the impact of the blood driven by the action of the muscular walls of the ventricles against the block produced by the columns of blood in the pulmonary artery and aorta, which press upon the semilunar valves.—I would adopt the explanation suggested by my valued friend, the late Dr. C. J. B. Williams, that "sound is a phenomenon resulting from resisted motion." Let us examine the condition of the circulation with regard to this particular point, namely, resisted motion. In this inquiry I have derived most important assistance from the admirable and elaborate researches of Professor Bell Pettigrew, F. R. S., first on "The Arrangement of the Muscular Fibres in the Ventricles of the Vertebrate Heart," published in the transactions of the Royal Society of London, 1864, and, secondly, on "The Relations, Structure and Functions of the Valves of the Vascular System," published in the transactions of the Royal Society of Edinburgh, 1864. These refer especially to the left ventricle, but, at the same time, it is to be observed that what applies to this ventricle applies, only in a lesser degree, to the right ventricle. Professor Pettigrew explains the manner in which the column of blood, projected from the heart into the aorta, is formed by the union of three columns, an arrangement which results from the mechanism of the heart, as fully described by him. These columns ultimately unite into one before reaching the orifice of the aorta. The columns have a spiral motion, which is

the result of the spiral arrangement of the muscoli papillares, of the spiral arrangement of the fibres composing the walls of the ventricle, as well as of the spiral shape of the left ventricular cavity itself. These points, illustrating the character of the flow of the current, are shown in the blood-cast from the interior of the left ventricle of a horse, which, by permission of the president of the Royal College of Surgeons, of England, I am able to submit to examination.

By this spiral, or what might be called "rifle," motion the blood is seen to be directed against the segments of the semilunar valves, which are thereby hastily thrown apart, the spiral current being continued for some distance within the aorta. The beautiful rifle mechanism here described is constructed with the definite objects of giving precision to the direction of the moving body against a given point and of securing greater velocity and force in that body—the moving column of blood. We have, in fact, here represented in nature—a matter of the deepest interest to the biologist—the mechanism of the comparatively modern rifle. The resistance to the stream of blood issuing from the ventricle is offered by the block formed by the column of blood resting on the aortic valves. These in their action are described by Professor Pettigrew as "closed by a spiral movement, by which these valves are wedged, and, as it were, screwed more and more tightly into each other;" the movement here—the spiral movement—being caused by "the direction of the sinuses of Valsalva, which curve toward each other and direct the blood in spiral waves upon the me-

sial line of each segment."

D. Lastly, sounds resembling the first (and second) sound of the heart can be produced artificially in accordance with the view contained in the preceding communication.—The experiment is thus made: A sheep's heart of good size (or that of a calf) may be used. It must be carefully cleared from pericardium, leaving the large vessels and pulmonary veins as far as possible intact. The orifices of the pulmonary veins must be laid into one, so as to permit a sufficient opening into the left auricle through which to divide the attachments of the mitral cusps and the muscoli papillares in the left ventricle, taking care in doing this not to injure the aortic segments when detaching the cusp that lies next them. The coronary artery must next be ligatured, and also the innominate artery where it springs from the aortic arch. The right auricle and ventricle should be removed. Through the opening made by laying into one the orifices of the pulmonary veins a bone nozzle should be passed. It is well, also, to ligature the auricular appendix and any points from which water may issue when the ventricle is filled. To the posterior orifice of the nozzle rubber tubing should be attached, communicating with a source of water supply, placed on a higher level, and another portion of rigid guttapercha tubing about three feet long should be introduced into the aorta. If now the ventricle be filled with water by means of the tube in the left auricle the water will, of course, pass into the ventricle and thence up the aorta, a portion of the water resting upon and closing the aortic sigmoid valves.

THE MAMMOTH HOSPITAL GRAB OF '95 IN NEW YORK.

It appears that at last, after two years of a bitter and relentless controversy over the iniquitous action of the medical corporations of New York in seizing on all the hospital appointments the subject has, at least for the time, quieted down, though it does not appear that the

ends of justice have by any means been satisfied.

It is true that Bellevue Medical College, the pet of Tammany Hall, has been forced to move out of public property and seek shelter under the friendly wing of the University. But even there it is said the dis-

membered faculty clamored for the lion's share from the school that saved them from extinction. Venerable eminent teachers were to be side-tracked or put on the road with the hollow husk of "consulting" appointments or the more euphemistic titles of "Emeriti." It has turned out the old story of "when thieves fall out there is some show for an honest man." The united (?), the "married" faculties were soon the centre of fierce dissension, and the combine went to pieces; the "University Bellevue Hospital Medical College" is already defunct before it ever gave evidence of tangible existence. At this juncture the committee on hospitals was facing the issue on the hospital reorganization of '95. Manley had formally withdrawn his charges against Dr. Austin Flint on the condition that the County Medical Association, instead of making a scapegoat of one man should indict every physician in New York implicated, which was done at the June meeting in the following vigorous terms:

RESOLUTIONS.

First.—Be it resolved, that after a thorough and impartial investigation by the Committee on Hospitals and Dispensaries of the New York Medical Association, it now be declared the sense and belief of this association that the reorganization of the medical service in the public hospitals of New York in 1895, as far as the participation of the medical profession therein is concerned, involved a violation of the code of ethics

of the American Medical Association, was vicious in principle and unjust in its effects.

Secondly.—Be it resolved, that this association deprecates and condemns the present system on which the medical management of the Department of Charities is conducted, and with the advent of Greater New York unconditionally pledges itself to leave nothing undone to effect its early repeal.

As will be noted, the resolutions adopted by the County Medical Association went farther than to condemn the code violation, but pledged itself to force the fighting and agitation until the wrong is righted, and it is definitely decided that the general profession have an equal number of the hospital appointments, and the public is led to understand that there are some brains in the medical profession outside the walls of medical colleges.

All this is most gratifying to the great body of general practitioners, as it gives us an assurance that the heart of the medical profession is yet in its right place, and it only needs to properly comprehend a question to justly settle it.

With the aggressive movement of the New York Medical League against against the great and growing hospital dispensary abuse we may soon expect the long-looked for correction of abuses in medical charities, with a possibility for one to hereafter exist by legitimate practice.

HOSPITAL REFORM.

Writing to the Birmingham Daily Post Mr. Lawson Tait says that "we (the profession) are entirely responsible for hospitals, and for all their faults as well as their merits." He maintains that the medical officers of the Birmingham Hospital could make an end of the trouble in a month. As a temporary expedient he suggests that they should assign 30 per cent. of their income accruing from hospital position for the assistance of their "struggling extra-mural brethren." We are sure the "struggling brethren" would decline any

such remedy. All they ask from their hospital colleagues is to use their influence to restrict the benefits of hospital treatment to those who need it and cannot afford to pay for it. Neither is it of any use to lay the whole blame on hospital honorary officers. The committees and governors of hospitals are equal or greater culprits. Our contemporary's pages are devoted to a discussion of the whole question of hospital abuse and contain many letters which we have not space to notice at present.

—The Lancet.



HYPOCHONDRIASIS.

In ordinary cases not unsuited to office treatment prescribe appropriate hygiene and medicine and supplement these by the galvanic and static currents.

If the patient is in a state of profound nervous exhaustion the preliminary sittings may be devoted to central galvanization repeated daily for about a week.

When central galvanization is too troublesome, and in other cases after it has been first employed, seat the patient upon the static platform connected with the positive pole. Ground the negative pole and gradually develop a full tonic and nutritional treatment as rapidly as the patient becomes accustomed to the apparatus.

Beginning with simple positive electrification next ground the multiple point breeze electrode and with the machine in moderately rapid action sweep the electrode rapidly up and down the spine and over the head for about five minutes. Make decided impressions upon the spinal centres at the back of the neck and in the lumbar region, applying to them a strong, stimulating breeze. Repeat this over the solar plexus, the liver and spleen.

As soon as the patient accepts sparks agreeably apply mild positive sparks to all the muscular parts of the body, regulating them to comfortable tolerance. Make each sitting from 15 to 20 minutes in length

and repeat daily if circumstances will permit until decided improvement is established. Then continue treatment three times a week until benefit ceases.

By reference to the chapter upon the physiological action of static currents it will be observed that it is one of the most effective regulators of functional disturbances that we can prescribe for the nervous system. If the liver performs its work properly and diet and hygiene reinforce the action of the current the mental state will rapidly improve under the above treatment.

TORPID CONDITIONS OF LIVER SPLEEN AND PANCREAS—BIL- IARY COLIC.

Faradic—For patients who have a special desire for treatment by other remedies than drugs the following method may be employed.

Connect a rectal electrode to the negative pole of an induction coil apparatus and insert it into the rectum. Select a metallic electrode with a small oval end and wrap about it a pledget of absorbent cotton moistened in hot water. For this purpose a mono-polar vaginal electrode answers very well. Connect this electrode with the positive pole and press it deeply between the abdominal muscles during expiration to reach as nearly as possible the site of the gall bladder.

Switch the 500-yard, No. 32, coil,

rapid vibrator and three or four cells into circuit. Increase the current strength from zero through the rheostat until full tolerance is reached. After about 10 minutes reduce the current sufficient to avoid discomfort and produce a few single impulse contractions by moving the switch-arm which controls the cells in and out of circuit. Repeat once a day or every second day according to the results produced.

Very few ordinary patients out of a hundred would care to test the above treatment, and the average practitioner would scarcely think of suggesting it to the majority of his office patients. A perfectly practical treatment, however, which can be employed in all cases which require more than medical prescribing, is the following:

Static.—Prescribe as usual whatever remedies are believed best indicated, and in addition seat the patient upon the static platform connected with the negative pole. Ground the positive pole and the brass point electrode. After explaining the nature of the static spark or otherwise preparing the mind of the patient for the application so that he or she will not be suddenly startled apply a few mild positive sparks to the spine, particularly the lumbar centres and also to the region of the liver and large intestines. As the patient becomes accustomed by one or two repetitions of the treatment to stronger sparks complete the sitting by effective counter-irritation (friction sparks) up and down the spine, over the right side and across the abdomen. See chapter upon special therapeutic effects for directions to produce various degrees of counter irritation, which is one of the most valuable of the therapeutic resources of static electricity. The character of counter-irritation produced by this high potential electric current far exceeds in value the surface counter-irritations of iodine and other drugs.

Under this method of treatment the patient will rapidly improve, will experience decided benefits to general health, and in the course of a few weeks will usually cease to require drug laxatives for a consid-

erable time to come. When nature again becomes torpid the same treatment can be repeated.

VASO-MOTOR, OR FORCES OF THE CIRCULATION.

The following experiments by Drs. Bowditch and Minot illustrate the influence of anesthetics on vaso-motor centres.

Anesthetics, in producing insensibility to have accomplished such results by antagonizing the effects of irritation of sensitive nerves. One of the most constant physiological results of irritation of a sensitive nerve is a rise of arterial tension, due to a reflex stimulation through the vaso-motor centres of the muscular walls of the smaller arteries, especially those of the intestines. It is ascertained that in the majority of cases the rise of blood tension consequent upon the irritation of the saphenous nerves is less marked when the animal is under the influence of ether than when the anesthetic is not used. The first object was to determine the effects of anesthesia on the reflex rise of the blood tension. This was accomplished in the following manner: An animal being placed on the operating table, in the supine position, a solution of curara was injected into the jugular vein, when paralysis ensued. When the respiratory movement ceased, the trachea connected by means of a glass canula, inserted into it with the apparatus for artificial respiration, was so adjusted as to imitate as closely as possible the normal respiratory rhythm. A canula was then placed in the carotid artery and connected with a mercury manometer, carrying a pen by means of which the blood tension was recorded on a long strip of paper, which was kept in uniform motion by clockwork. The saphenous nerve was then placed upon electrodes. The irritation of the nerve was produced by closing the currents by means of a key provided with a pen, thus recording the blood tension, which could be seen at a glance. After the anesthetic had been administered the nerve was again irritated. Then the blood tension was notably de-

creased, and so continued to be as long as these experiments were tried. But far more constant and obvious were the results obtained from chloroform. Here the irritation of the saphenous nerve caused a less marked rise in the blood tension and sometimes there was no rise whatever. These facts present to my mind the clearest evidence in favor of the electrical remedy in cases of deep chloroform toxemia, and the propriety of having accessibility to a Faradic instrument, complete and ready for immediate use, in chloroform administrations.

E. Dubois Reymond first succeeded in demonstrating the presence of specific muscle and nerve currents by deflection of the magnetic needle. He likewise ascertained that, if the muscle or nerve be excited by electric currents or by mechanical or chemical irritants, so that the first is physiologically active, and the latter caused to contract, and then placed at two symmetrical points in connection with the galvano-multiplier, a less deflection of the needle is produced than when the nerve or muscle is in a quiescent state. This is called the negative variation of the current. The conclusion arrived at by Dr. Dubois Reymond was that nerve and muscle contain innumerable positive and negative electric molecules, which move with great regularity throughout the tissue. Perchance the power of electricity in cases of suspended animation is to restore the suspended electrical forces of the body to a normal condition, and thus reanimate failing vitality.

The effect of chloroform may be remedied in much the same way; that is to say, by appealing to the vaso-motor centres through the pneumogastric axis.

No nervous centre can act of its own motion or originate action. It must be excited to action. We might as well speak of sight without the action of the waves of the luminous ether, or sound without the vibration of sonorous substances. In investigation medicine has called to her aid other physical sciences. Natural philosophy has furnished the explanation of the mechanical contriv-

ances, and we look to mechanics, hydraulics and pneumatics to aid us to interpret the phenomena of locomotion, circulation and respiration. It has furnished in electricity the probable means of interpretation of the force which operates the mechanism, the phenomena of nerve power; she has furnished the microscope to enable us to see things invisible to the naked sight, whilst chemistry has laid before us the knowledge of the fluids of the body, and enabled us to solve the mysteries of digestion. These sciences have been called the handmaids of medicine; they are, in fact, parts of the whole; without them no physiology; without physiology no art of medicine.

But with scalpel, microscope and chemistry we fail to delineate the anatomy of the nervous system. It is a truth that that which is is but the sequence of that which was. The results of to-day could not be had without the investigations of yesterday. In like manner will the knowledge of to-day be the basis of the conclusions of to-morrow—such is the law of intellectual development; such is the sequence of scientific advancement. Sir Charles Bell first showed that the nerves of the human organization are distributed with regularity. It is the basis of the physiology of the nervous system. He first called attention to the functions of the spinal nerves, pointed out their different structures, and their different functions; distinguished the sensory and the motor. Marshall Hall succeeded Bell, and we had his excito-motor system. Others succeeded Hall to explain nervous phenomena, among whom stands pre-eminent the great Claude Bernard.

But we owe more to Marshall Hall than the explanations he has given of nervous phenomena. He demonstrated that when the scalpel and microscope fail to determine its anatomy, we can yet map out the anatomy of the system. A physiological fact is as certain an indication of nervous distribution as though we could follow its ramifications, scalpel in hand, or microscope to eye. Observation and experiment is the thread which leads out of the labyrinth, without which we must

be lost in its intricate masses. Marshall Hall has given us a map of the excito-motor system of nerves. Bernard has shown their peripheral distribution. The functions of the brain and spinal marrow are to be laid before us by perusing the same line of investigation. By experiment, the number of devoted investigators give an earnest promise that the science of life may yet be illustrated, that the opprobrium that medicine is only an empiricism may be expunged, and that the day will yet arrive when medicine will be practiced upon laws or principles known and recognized.

The whole forms a beautiful piece of mechanism, whereby under the orders of certain nerve centres it is set in motion. Blood flows in by the arteries regulated by the vasomotors; the veins receive it, and dilate under the direction of the vasodilators; the muscular bands are brought into play by the nerve power conveyed to them, the result being what we call full nutrition. When nerve power is exhausted, or its exaltation diminishes, muscles relax, veins contract, the parts are freed from blood.

As a typical illustration of involuntary force we will cite its influence on the heart's action—say for seventy years—and, for convenience, fix the pulsations at sixty per minute. Then we will have the proposition of sixty multiplied by sixty equals 3600 beats per hour. Again 3600 multiplied by ten equals 36,000 beats in ten hours; or, in the words of the learned Draper, this little organ can execute "three thousand million beats without a stop and propel a half million tons of blood, and mo-

mentarily wasting, repairs its own waste all this time.

The mathematical rhythm of four moving cavities, the perfect closure of its mitral and semi-lunar valves, and the regurgitating play of its tricuspid have never failed. Much more could be said of other vital organs under the control of the involuntary force. In the face of all these facts how strikingly true is the saying, "How fearfully and wonderfully we are made," for, in regard to the heart, we have but to note that its nerve supply springs principally from three little ganglia, and a few nerve fibres originating from the brain, spinal cord and sympathetic.

How delicate the source, how fragile and thread-like the conductors; how readily implicated; how sudden and certain the result. Yet, in death from such a cause how obscure the character of the lesion:

"There is a divinity that shapes our end,

Rough hew them as we may,
A law; a Law-Giver; our Father.
Amen."

"See through this air, this ocean and this earth,

All matter quick and bursting into birth,

Above, how high, progressive life may go,

Around, how wide, how deep extend below.

"Vast chain of being, which from God began,

Nature ethereal, human, angel, man,
Beast, bird, fish, insect, which no eye can see,

No glass can reach, from Infinite to Thee."



Clinical Medicine.

In charge of DR. J. J. MORRISSEY.

THE HISTORY OF A VALVULAR CICATRIX.

J. J. MORRISSEY, A. M., M. D., Ph. D.,

Associate Professor of Practice in the New York School of Clinical Medicine.

The treatment of heart lesions has been revolutionized within the past decade of years. Before that period the existence of a heart murmur was sufficient to call forth from the watchful physician every means which therapeutics placed in his hands. A more accurate knowledge of the anatomical relations existing between different portions of the cardiac apparatus, as well as a proper realization of physiological considerations, has gradually led us to the belief that a valvular lesion per se is not the pathological factor it was at one time considered. More enlightened views now prevail, and we have finally come to the conclusion that every patient afflicted with a valvular lesion is not doomed to an early death. A man may be engaged in any of the active occupations of life thoroughly unconscious, so far as the subjective symptoms are concerned, of the presence of an ancient endocarditis, and he may attain a ripe old age without any deficient power or lack of strength on the part of the heart disclosing itself.

As we have so strenuously insisted in the pages of this magazine in writing of other diseases, so do we now reiterate, for it cannot be too often repeated, that every individual is a law unto himself in the proper estimation of the consequences of cardiac lesions. The patient's physical construction, his personal peculiarities, his habits, his occupation

and environment, these are among the many factors which should enter into our prognosis. Many a man has had his whole life embittered and his value to the community contracted by being told of the existence of "heart disease" without proper supplementary explanation.

To the French authors in particular we are chiefly indebted for the increased knowledge and proper appreciation of the scope and danger of the consequences of valvular lesion which we now possess.

They divide the history of a cardiac valvular lesion into four stages: (1) We find the heart not at all affected in its force and strength by the presence of the valvular cicatrix. Objectively a soft, blowing murmur may manifest itself, say at the apex, without the slightest untoward symptom. The heart's action is normal, the pulse regular, with no undue arterial tension. No interference is demanded or warranted on the part of the physician, yet it is generally in this stage that the unscientific physician, with his meddling therapeutics, does much irreparable injury. A murmur is present, therefore he gives digitalis, and the very condition he strives to prevent is what he induces. It is not too strong an assertion to make that digitalis has done more harm in the hands of some physicians than it has effected good with others. And the use of this sovereign drug has been

again and again condemned because ignorant practitioners have used it illegitimately.

In the first stage, called by the French the stage of eusystole, drugs are positively harmful. (2) When the imperfection of the valve advances further, and the labor of the heart is correspondingly increased, compensatory changes, first of a slight character, and only discernible by the practiced ear, demonstrate themselves, and arterial tension is raised. The hypertrophy—a conservative process—may be maintained in its original condition for years, if all other sources of irritation aside from the imperfection of the valve be removed. It is in this stage of hypersystole that judicious advice may be given, and if strictly followed as to diet, the removal of all sources of cardiac poisons, tea, coffee, tobacco, the ingestion of large quantities of beer or alcohol of any description, in a word, the maintenance of the individual's physical and mental processes at the highest normal point, we can watch with equanimity the hypertrophy, recognizing that the powers of the individual will not be irretrievably damaged by the cardiac difficulty. In this condition also drugs are absolutely uncalled for. The careful physician soon concludes that scientific diet is far better than unscientific medication, and this is more particularly applicable to the adoption and use of a dietary that will not leave an enormous amount of waste ash, for if the latter is not quickly eliminated from the system a high condition of functional activity of the kidneys supervenes, and reacting upon the general circulation, detrimentally affects the heart, quickly producing a condition which all our efforts should be concentrated on preventing, namely the period of (3) hyposystole.

Here the cardiac muscle begins to soften, the heart dilates, the arterial tension falls, odema, congestion and dyspnea appear. The contrast between the two conditions is at once apparent. To maintain the hypertrophy drugs, with, perhaps, the single exception of iron, are contraindicated, but certain conditions must

prevail as mentioned above: (1) The muscular tissue of the heart must be healthy, (2) it must receive sufficient arterial blood, (3) the waste products must be rapidly removed from the system, (4) the nerves of the heart must be in a normal state. In other words, the heart, as an organ, should be preserved in the highest condition of nutritional activity. But unfortunately it is in the condition of dilatation that we are most frequently summoned, very often to find it combined with advanced Bright's disease.

In dilatation we have primary and secondary causes: (1) Impaired nutrition with extreme anemia, (2) the excessive use of the articles which were condemned above, namely, tea, coffee, tobacco, alcohol, and to which might be added extreme venery. The secondary causes have no direct bearing upon the subject in hand, but among them may be enumerated insufficiency of the aortic and mitral valves, obstruction to the aortic circulation, atheromatous changes in the coronary arteries, arterial sclerosis, and the numerous sequelae of renal inadequacy. But of this group of diseases which have the heart for their seat and the arteries for their origin it is not now our intention to speak.

To return to the period of hyposystole, this is the condition in which digitalis, judiciously used, has a most beneficial effect. It makes the heart beat slower, it prolongs the diastole, it strengthens the systole and diminishes the irregularity. We do not intend to enter upon the treatment of cardiac affections in this paper, as we shall deal more at length with that topic on some future occasion, but will merely add that rest of body and mind is of prime importance in the consequences of valvular affections of the heart. As the condition of dilatation, with its numerous sequelae, advances a period is reached when the myocardium becomes gradually weaker, undergoing fatty degeneration and not responding to any marked extent to the action of digitalis. To this condition the name amyocardie has been given by Huchard. Herein treatment is of

little avail, and caffen generally takes the place of digitalis.

This then is the history of a valvular cicatrix and its consequences, and from what has been written it is plainly evident that it is practically only in the third period, that of hypo-

systole, where drugs avail much. In the other conditions the maintenance of the conservative processes which aid and abet the heart in its physiological battle is to be strongly advocated.

Current Medical Literature.

SMALL POX AND VACCINATION

At a meeting of the Royal Statistical Society, held on the 15th instant, at the Royal United Service Institution, Mr. A. Milnes, M. A., read a paper on "Statistics of Small Pox and Vaccination, with special reference to Age-Incidence, Sex-Incidence, and Sanitation." Mr. Milnes cited the statistics of vaccination and small pox from 1872 onwards to show that the greatest decline in small pox had been coincident with the greatest amount of refusal to comply with the vaccination acts; and incidental allusion was made to the striking increase of medical postponements of vaccination, as showing that even medical men are less willing than they used to be to vaccinate any child under any conditions. By comparison of the history of other diseases, both epidemic and endemic, it was shown that these others have, without vaccination, diminished as fast, and as far as small pox has done with it. And, moreover, as the proportion of vaccinated persons had increased in the population as a whole, so also the proportion of vaccinated patients had increased in the small pox hospitals. Not the most stringent re-vaccination can protect armies from small pox, our troops in India experiencing a proportion of deaths total small pox cases double as high

as that of unvaccinated Leicester in the recent outbreak there. Comparison by localities went to show that the highest development to which compulsion can force the vaccination of a community, will never really protect that community from devastating epidemics of small pox. Hence there was no one now to be found to deny that small pox attacks the vaccinated; but this admission was the diametrical contradiction of the promises that passed the law. On the question of age-incidence, Mr. Milnes devoted much care to the development of the argument that sanitary measures were capable not only of reducing greatly the general mortality of an epidemic disease; but of still more largely reducing the children's share of such portion of it as remained. As to sex-incidence, it was shown that inasmuch as primary vaccination applies to both sexes alike, and re-vaccination in great preponderance to the young adult male, we ought to find small pox, whilst equally incident on both sexes of children, attacking in adult life a great preponderance of females. The facts, however, were the other way. The children, it was true, suffered both sexes about alike; but among adults the mortality of small pox fell almost twice as heavily on the males.

—Med. Times and Hospital Gazette.

A MISNOMER.

Is there a typho-malarial fever? Yes, in the brains of the doctors, but not in the bodies of the patients. There is no combined hybrid disease, and it is only due to Woodward to say that he did not recognize a hybrid disease. Typho-malaria is a villainous name and should be banished from our vocabularies, and no doctor should ever use it, particularly to his patients. It gives a man a wrong sense of security, and the doctor wastes a lot of good medicine, a lot of quinine, for instance, because he thinks there is some symptom that points to malaria. I am happy to say that cases of typho-malaria are disappearing slowly from the health reports; they ought to be banished entirely. Chills, as I told you, occur frequently at the outset of a disease, and they may occur throughout the course of a typhoid fever. The State boards of health hereafter should return to every physician who sends in a diagnosis of typho-malaria his blank and ask for something better. It is too late in the day, gentlemen, to make that diagnosis.

—Dr. William Osler, in Maryland Medical Journal.

ON THE TREATMENT OF CATARRHAL DISEASES IN ST. ELIZABETH'S HOSPITAL, VIENNA, WITH GUAIACOL CARBONATE (DUOTAL).

By DR. NIED, Physician in Chief, (Allgemeine Wiener Medizinische Zeitung, June 1, 1897).

In his article on "The Creosote Treatment in Childhood" (Wiener Medizin Blatter, 1896, No. 49) Dr. Hock emphasizes the value of creosotal not only in cases of pronounced pulmonary disease, "but also in the treatment of the catarrhs that are so frequently left behind by whooping cough and measles, and which are well known as the prodromate or predisposing causes of tubercular infection. Treatment with the ordinary expectorants, as is usually recommended, is here entirely useless. Besides the hydiatic treatment it is only from that with creosote that

we may expect favorable results." Creosotal is especially useful in the treatment of these cases, and Dr. Hock is in the habit of employing the following formula:

Creosotal.....3-5.0 (3-4 to 1 1-4 dr.)
Ol. Morrhuæ.....100.0 (3 1-3 oz.)
Saccharini.....0.05 (3-4 gr.)

To older children who do not want to take cod liver oil the creosotal was given in alcoholic solution and in drops, or emulsified by drops in sugar water."

The dosage in children less than one year old was 0.15 (2 1-4 grains), gradually increasing to 0.5 (7 1-2 grains), or from a teaspoonful of 3 per cent. creosotal cod liver oil to two teaspoonfuls of a 5 per cent. solution. Older children took from 0.5 (7 1-2 grains) to 1.5 (22 1-2 grains) daily.

The great prevalence of catarrhal troubles during the last winter gave me an excellent opportunity to experiment upon adults with guaiacol carbonate, which has an analogous action to that of creosote carbonate.*

In the period extending from January 17 to February 12 I treated 12 female patients of ages between 23 and 75 years, who were suffering from acute bronchitis, complicated in some cases with influenza, with guaiacol carbonate. In accordance with the severity of the attack the following doses were employed:

First day, morning and evening, 0.5 gm. (7 1-2 grains) of guaiacol carbonate.

Second and succeeding days, 1 gm. (15 grains) twice daily; or, first and second days, mornings and evenings, 1 gm. (15 grains).

Third and succeeding days, 1.5 gm. (22 1-2 grains) twice daily; or, first day, 1 gm. (15 grains) twice.

Second day, 1.5 gm. (22 1-2 grains) twice.

Third and succeeding days, 2 gm. (30 grains) twice a day.

*As is well known, guaiacol is the chief constituent of creosote. The value of a specimen of creosote depends upon the amount of guaiacol that it contains. Creosotal is a creosote that, by reason of its combination with carbonic acid, is transformed into a neutral, non-poisonous, non-caustic body, without the loss of any of its therapeutic properties. Guaiacol Carbonate is guaiacol combined with carbonic acid in the same way.

The effect of the remedy was usually apparent upon the second day, and latest upon the fourth. It showed itself by a reappearance of the appetite and a loosening of the mucus in the tubes. The expectoration ceased in from 14 to 20 days. In from two to three weeks the patients were discharged cured. The following condensed histories will illustrate my assertions:

1.—Katharina Oetl, 67 years old, fell sick on January 17, with acute bronchitis. On the first day the patient was given, morning and evening, 0.5 gm. (7 1-2 grains) of guaiacol carbonate; on the second day 1 gm. (15 grains), and on the third day 1.5 gm. (22 1-2 grains). Increase of appetite and expectoration soon set in, and on February 3 she was discharged cured.

2. Theresa Crisch, 26 years old, suffering from Acute bronchitis, which begun on January 18. For the first three days she was given 1.0 gm. (15 grains) night and morning; on the following days 1.5 gm. (22 1-2 grains) twice a day. On the second day of the treatment an increase of appetite was noted, the ex-

pectoration, which was at first very slight, became greatly increased by the fourth day, so that by February 7 she could be discharged cured.

3.—Maria Stoiber, 23 years old, was attacked on January 19 with an acute bronchitis (influenza). On the first day she received 1 gm. (15 grains); on the second day 1.5 gm. (22 1-2 grains), and on the remaining days 2 gm. (30 grains) of the guaiacol carbonate. The appetite began to reappear upon the third day only, but it rapidly improved. The mucus secretion was large from the very beginning of the treatment. On February 10 she was discharged cured.

Besides these I treated six nuns, two of whom were aged respectively 79 and 81 years, for acute bronchitis. I gave them 1 gm. (15 grains) of guaiacol carbonate twice daily for three weeks. Appetite and expectoration reappeared upon the third day, and all the patients got well.

These very favorable results should encourage us to further trial of guaiacol carbonate in acute bronchitis and other catarrhal diseases.

FOREIGN EXCHANGE

By DR. A. S. DAVIDSON.

THE MIXINFECTION IN PULMONARY TUBERCULOSIS.

J. A. SCHABAD.

Russkiji Archiv Patologii Klinitcheskoi Medecini i Bacteriologii, Vol. II, Parts 5 and 6.

From the voluminous monograph we can abstract only a few results. In all 31 cases of pulmonary phthisis were examined. The sputum was examined in every case at different periods from one to four times, utilizing Kilzato's method of washing

out the sputum. Mostly he found one or two kinds of micro-organisms, rarely three and five kinds. As to frequency, the micro-organisms were found as follows:

Mucous membrane streptococci in 19 cases 29 times.

Streptococci in 12 cases 13 times.

Pneumococci Frankel-Wechselbaum in 12 cases 10 times.

Staphylococcus yellow, in 7 cases 12 times.

Staphylococcus white, in one case one time.

Pneumobacilli Friedlander in four cases four times.

Proteus vulgaris in three cases three times.

Bacillus influenza in two cases three times.

Bacillus coli commune in two cases three times.

M. tetragenus in two cases two times.

Diplococcus intracell Weichselbaum in two cases two times.

Bact. pyoflour, Ledderhose, in one case one time.

Bact. pyocyaneus, Ledderhose, in one case one time.

Coccus albus liquefac. Besser in one case one time.

The blood was examined in seven cases during the life of the patients. In one case only author found the *staphylococcus alba* in the blood extracted from a vein by means of a syringe. Of the 31 cases 21 ended fatally. In 17 cases post mortem sections were made, and only in one case were strange microbes obtained from microscopical and by culture media. In one case author obtained from the lung tissue and from a caverna inoculation of *M. tetragenus*. The same was found near the tubercle bacilli in the olveoli exudate. In the remaining cases author found the streptococci pyogenus, as well as other kinds—the pneumobacillus of Friedlander, the pneumococcus of Frankel, the *bact. coli commune*, etc. In the post-mortem examination of the blood the pyogenus streptococcus was mostly found. In the histological examination the streptococcus was mostly found, aside from the tubercle bacilli. In the alveoli exudate the tubercle bacilli were in small numbers, and in those cases where the streptococci were also found, the latter largely prevailed.

Author, basing on these observations, concludes that nearly all cases of pulmonary tuberculosis which come to the dissecting table consist of mixinfection, the principal activity of which is due to the streptococcus pyogenus. The *M. tetragenus* the author also ascribes a pathogenic action as well as an initiator to a chronic catharal pneumonia. As a mixinfection of pulmonary tuberculosis author considers those

cases in which different microbes can be found in the lung tissue, in the capillaries or in the blood. The finding of pathogenic micro-organisms in the sputa after the method of Kilsato is not sufficient to diagnose as mixinfection, since experience teaches that not all microbes obtained in this manner come from the lungs. The only exception is that of the *staphylococcus pyogenus*. It is important, according to author, to distinguish the streptococcus pyogenus from the so-called mucous membrane streptococcus. The latter equals the first morphologically, differentiates itself, however, in biologic peculiarities and principally that it is not pathogenic, while the mucous membrane streptococcus is absolutely uninjurious. The streptococcus is of great diagnostic value. Its presence proves the existence of a streptococci mixinfection. The secondary infection caused by the *M. tetragenus* is less rare than the pneumococci. Secondary infection generally sets in in the last stadium of pulmonary tuberculosis and leads rapidly to the fatal end. The microbes which add in the secondary infection participate simultaneously with the tubercle bacilli in the secondary pneumatic process. Even if they do not aid in the formation of the exudate they act through their toxins on the general condition of the patient, on the fever, and, as the author convinced himself, take an active part in the destruction of the lung tissue and the formation of cavities. Yet there are cases which rapidly develop to the hectic state, ending fatally and not depending on any mixed infection. In mixinfection with streptococci, the fever is generally remittent, but constant. Absolutely normal temperature in mixinfection does not occur.

BACTERIOLOGICAL EXAMINATION OF THE BLOOD.

HANS KOHN.

Deut. Med. Woch., Feb. 25, 1897.

Author gives his researches upon this subject and especially in cases of acute pneumonia. He employed Sittmon's method, in which, with all the usual precautions, 5cc. of blood

is obtained with a sterilized needle from the veins of the arm, 1cc. of blood is mixed with nutrient agar previously made fluid, and the whole poured out into a dish. In cases of general sepsis due to malignant endocarditis the streptococcus in numerous colonies was obtained in one case along with a few colonies of the staphylococcus, but in a second case the staphylococcus alone was found. In three cases of of subacute and chronic endocarditis the results were negative, except in one case, where there was a thrombophlebitis, and here six staphylococcus colonies developed on two plates. In one case of erysipelas, in one of phlegmon, in one of icterus with enlarged spleen, in one of paroxysmal hemoglobinuria and in one case of aphthous stomatitis with severe intestinal symptoms the results were negative. In eight cases of enteric fever a bacillus was found in two cases, but it could not be proved to be the typhoid bacillus. In one case of chronic leucaemia and one of pseudo leucaemia the results were negative. In one case of pyaemia with joint manifestations the streptococcus was found, but in two cases of acute rheumatism the results were negative. In 18 out of 32 cases of acute pneumonia no colonies developed, and all these patients recovered. In seven cases the pneumococcus was found, and all these cases were fatal. In three other cases positive results were obtained, but these patients recovered. Three further cases proved fatal, but no micro-organisms developed from the blood. Twice were the results again negative, but death was here due to a staphylococcus empyema. In one of these fatal cases without micro-organisms, the patient was an old man and a drunkard, in another influenza bacilli were found in the lung, and in the third there was nothing especial to note. Thus in by far the greatest number of cases which recovered the cultivation experiments were negative, whereas in the large majority of fatal cases the pneumococcus was found in the blood. The colonies varied from 10 to 200. The positive results were obtained 24 to 48 hours before death. The presence of pneumococcus in the

blood is, therefore, of unfavorable import, and these results confirm those observed by other observers. Thus in a certain number of cases of pneumonia the severity of the disease is due to a complicating sepsis, namely a pneumococcus sepsis. To the other possible causes of death sepsis must be added. It is possible that the cardiac failure is due to the action of toxins, which may even act more powerfully when the micro-organisms are present in the blood. Until a specific (bacteriological) treatment is discovered, efforts must be made to get rid of the micro-organisms from the blood by diuresis, etc. The administration of large quantities of fluid may, however, further embarrass an already overburdened tract.

THE MOTOR FUNCTION OF THE STOMACH.

GOLDSCHMIDT.

Munch. Med. Woch., March 30, 1897.

Author describes a method of estimating the motor functions. Leube and others recommended emptying the stomach at stated times after a test meal to find out whether the contents had disappeared. Klemperer's oil method is open to many objections. The salol test, even as modified by Huber, is not altogether satisfactory. These methods are not adapted for ascertaining the amount of the stomach contents in the various stages of digestion. It is impossible to empty the stomach completely with the tube. It was sought to estimate the remainder by introducing a solution of hydrochloric acid of known strength, so calculating the fluid remaining in the stomach by the dilution the acid solution underwent. Grape sugar has also been used for the same purpose as being more easy of determination. Another method consists in introducing 100cc. of distilled water and comparing the specific gravity of the fluid drawn off with that of the stomach contents first obtained. The author has investigated this subject in a patient with a gastric fistula. After expressing the stomach contents he introduced 50cc. of distilled water and again expresses.

Both specimens are filtered. As many c. cm. of distilled water are added as will produce the specific gravity of the second filtrate. The number of c. cm. added will represent the amount of fluid left in the stomach after the first expression. The temperature of both fluids must be the same. The author's investigations have shown this procedure to be accurate, and it is very simple.

NEW EDITION OF THE BABY-LONIAN TALMUD, ENGLISH TRANSLATION, ORIGINAL TEXT TRANSLATED, FORMULATED AND PUNCTUATED BY MICHAEL R. RODKINSON.

Revised and corrected by the Rev. Dr. Isaac M. Wise, president

Hebrew Union College, Cincinnati, O. Vol I, Tract Sabbath; Vol. II, Section Moed (Festivals) Tract Sabbath; Vol. IV, Section Moed (Festivals) Tract Schekolim and Rosh Hashana. Hebrew and English.

We had the pleasure of receiving the above volumes, which, however, is not our domain to review. We are safe in saying that those able and in position to do so will accord it its due merit. We are, however, waiting for the tract at Nide, which, from a medical point of view, will be of great interest.

The undertaking is certainly a gigantic one, since it comprises the science and literature of a nation during a period of 1000 years. We congratulate Mr. Rodkinson and hope for a realization of this great work.

A. D. D.

Current Surgical Literature.

T. H. MANLEY, M. D., New York, Editor.

TETANUS CURED BY INJECTION OF CARBOLIC ACID.

Poli (Gazz. degli Osped., March 14, 1897) reports the case of a boy, aged 16, who was kicked on the foot by a horse. Five days later symptoms of tetanus set in. The wound had been dressed with a bit of rag, a leaf and waxplaster. On admission (September 28) the wounded part was excised and thoroughly cleansed with carbolic and iodoform. Bromide and chloral given internally, and injection of 1 per cent. carbolic solution given every two hours. Nicolaier's bacillus was found in the excised tissue September 30 and the patient could open his mouth a little and the face was less contracted. October 2 trismus and opisthotonos still well marked. October 4, temperature normal, but tet-

anic symptoms as before. The carbolic injections were now given every hour. On October 16 the patient was practically well, but the injections were continued every two hours up to October 28. Although this case at first sight seems to support the equine theory of tetanus, further examination convinced the author that, on the contrary, it really supported the telluric theory. Other cases where carbolic injections had been successful in tetanus are referred to, and although nearly 500 injections were given in this case no bad results were noticed.

CAESAREAN SECTION FOR CANCER OF THE UTERUS.

Robert Sorel (Arch. Provinc. de Chirurgie, May, 1897) thinks that although the range of usefulness of Caesarean section has recently been

limited by the introduction of symphysiotomy, etc., it still finds a clear indication when cancer of the uterus has rendered cervical dilatation impossible. The case reported was one in which pregnancy had arrived at the full term. The cancer was not one that could be operated upon. Labor had been going on for sixty hours without a trace of dilatation. Caesarean section was performed, and the infant was saved alive. The patient is still living, but the cancer is making steady, although slow, progress. Had Sorel seen the case in early pregnancy he would have counseled removal of the whole uterus; as it was, Caesarean section was preferable to total abdominal hysterectomy as being more rapid and less dangerous, and because the malignant disease had already invaded the vagina.

OPERATION FOR APPENDICITIS IN AN INFANT AGED FOUR.

F. Villard (*Journ. de Clin. et de Therap.*, infant, April 22, 1897) reports a case of appendicitis in an infant scarcely four years of age. There was a history of habitual constipation. About two days previous the child began to complain of pain in the right side of the abdomen, and this steadily increased, being worst at night. There was a swelling in the right iliac fossa and pain on pressure. Micturition was normal, but there was complete constipation. There had been some vomiting, and the temperature was above the normal. An incision was made above Poupart's ligament. It was noted that the cellular tissue was oedematous, and on cutting through the muscular layers a large abscess cavity with some fecal contents were opened into. The pus was evacuated, and an unsuccessful attempt made to find the appendix. A further attempt revealed it lying behind the cecum and perforated at its base. It was easily removed, and was found to contain a small mass of hardened feces. Villard is of opinion that one should operate between the second and third day in such cases if the symptoms do not

ameliorate. One should not temporize, although the condition may attempt one to do so.

THE SURGICAL TREATMENT OF PERFORATIVE PERITONITIS IN TYPHOID FEVER.

Monod and Vanverts (*Rev. de Chir.*, March, 1897), after a careful study of published statistics have formed the following conclusions with regard to the operative treatment of perforating typhoid ulcer: 1. The results of surgical intervention in cases of diffused peritonitis consequent on intestinal perforations of typhoid fever are not very encouraging; 2. as, however, this lesion, if left to itself, is almost certainly fatal (95 per cent. of fatal cases), it is justifiable to resort to an intervention the general results of which (88 per cent. of mortality) are better than those of expectation; 3. the prospects of operative treatment are less unfavorable when the perforation has occurred at a late stage of typhoid fever, and particularly during convalescence or at the end of a relapse. The surgeon, however, may act at any period of the fever at which the perforation is produced, provided, there is no distinct contraindications presented by the general conditions of the patient; 4. the operation should be performed with the least possible delay, a condition of success which may be taken advantage of as an immediate diagnosis of perforation is possible in most cases; 5. the results of surgical intervention, and more particularly of suturing, are excellent with regard to occlusion of the perforation, but, on the other hand, are unfortunately less favorable with regard to the survival of the patient; 6. the causes of the almost constant failures are multiple, the most frequent being persistence of the intensely septic peritonitis, occurrence of fresh perforations, and extreme exhaustion of the patient; 7. this last condition should in certain cases constitute a contraindication to surgical treatment. If, in fact, the patient seem too exhausted or collapsed to be capable of bearing an operation it would be well to

abstain; 8. surgical intervention would in most cases consist in median laparotomy and simple suture of the perforation. Intestinal resection and the formation of an unnatural anus would be reserved for cases in which the lesions are more or less complicated; free irrigation and drainage would complete the operation; 9. in a case of encysted peritonitis, the frequency and severity of which lesion are less considerable, the surgeon should restrict his intervention to simple incision over the seat of the disease, in order to effect evacuation of the pyo-stercoral accumulation. It might under such circumstances be possible to recognize the perforation, and to close it by suture.

—The British Medical Journal.

THE SILVER TREATMENT OF WOUNDS.

By HOFRATH DR. CREDE,
Divisionsarzt a la Suite, Chief of the Surgical Division of the Carola Hospital in Dresden.

1. PRELIMINARY REMARKS.

The silver treatment of wounds is based upon the well known facts that silver and its salts possess pre-eminent antiseptic properties, and that they are at the same time entirely non-poisonous to the human organism. In my essay entitled, "Silver and the Silver Salts as Antiseptics," Leipzig, F. C. W. Vogel, June, 1896, I have given the reasons for their bactericide action; have detailed the properties of the various argentic salts; and have described their application to surgical diseases and the healing process that takes place under their use. I refer the reader to this publication for particulars. My experiences since that time with 1500 more patients confirm every assertion that I have made, and I feel that I am now in a position to elaborate the method, and to formulate it as a definite system of treatment. The outlines of this system I propose to sketch in the following lines. It goes, of course, without saying that each case must be treated according to its individual requirements, and that in each specialty certain modifications will be found necessary. Elsewhere I shall consider the sub-

ject of the various infectious diseases in which, to my mind, silver has undoubted and important effects. My method of the silver treatment of wounds is applicable in war and in times of peace; to hospital as well as to private practice; in every part of the body, and to every kind of wound. By it the best imaginable results can be obtained, and, finally, its execution is very simple, cheap and economical in the expenditure of time and strength.

2. MATERIALS EMPLOYED IN THE SILVER TREATMENT OF WOUNDS.

1. Citrate of Silver, chemically pure (Arg. citr. puriss.), a white, stable, odorless, non-irritating powder, soluble in the proportion of 1-3800 parts of water. This is the chief antiseptic for wounds; for, the smallest quantity of it dusted upon a lesion keeps it permanently sterile. In solution of 1 to 4-8000 it is employed for the irrigation of the cavities of the body.

2. Lactate of Silver, chemically pure (Arg. lact. puriss.), a white, permanent powder, soluble 1 part in 15 of water. In the solid form it is somewhat irritating, and it is most useful for the preparation of disinfectant solutions of the strength of 1 to 100-2000, and for the preparation of silver sutures and drains.

In the fluids of the animal body both salts show a greater antiseptic power than does the sublimate, without having its disadvantages. Watery solutions are best made twice as strong as those of sublimate to have about the same effect.

3. Tablets of Citrate of Silver of 0.1 grm. (1 1-2 grains), for the convenient preparation of solutions for irrigation, injections and gargles.

4. Tablets of the Lactate of Silver, each 0.2 grm. (3 grains) to be used instead of sublimate tablets.

All these four preparations are made by the "Chemische Fabrik von Heyden," Radebeul, near Dresden.

5. Silver Gauze, a muslin evenly, powerfully and permanently impregnated with metallic silver; it develops its antiseptic properties wherever the tissue fluids form acids, which unite with the silver to form the antiseptic salts. This occurs, for

instance, during the life action of the schizomycetes, and continues as long as any silver is present. It is not necessary to use it in wounds that have been dusted with the citrate of silver; ordinary sterilized gauze is sufficient here. In cases where this has not been done, it forms an unchangeable and ever-clean dressing, which in itself disinfects smaller wounds, and keeps non-infected larger ones sterile. It is especially valuable for use outside the larger hospital centres, and is prepared by Max Arnold in Chemnitz.

6. Citrate of Silver Bougies, prepared from pure cocoa butter and containing 2 per cent. of the citrate. They are valuable for the disinfection of deep fistulas, the urethra, the bladder, the uterus, etc.

7. Silver Silk, Silver Catgut and Silver Drainage Tubes. These can be prepared by the physician himself or by any manufacturer of surgical dressings. The raw material, without any special preparation, is put in a wide-mouthed, brown-colored glass bottle containing a 1 per cent. solution of the lactate of silver. Silk should remain immersed therein fourteen days, catgut and drains eight days; then the material should be taken out, thoroughly rinsed in ordinary water until the latter remains clear, and then exposed to daylight until it becomes blackish brown in color. It is to be preserved well wrapped in several thicknesses of gauze, and immediately before it is used it should be laid for a few minutes in boiled water and rinsed therein. Silk and catgut can be appropriately kept in alcohol. The silver that they contain make the ligatures antiseptic of themselves, where that is necessary.

3. DIRECTIONS FOR CLEANSING. For Physicians and Nurses.

1. Thorough soaping and scrubbing of the hands and forearms, special attention being paid to keeping the nails short and smooth.

2. Rinsing with pure lukewarm water.

3. Washing and brushing the hands and forearms with a solution of the sublimate 1 to 2000, or of the lactate of silver 1 to 1000.

4. After each contact with non-infected articles, washing of the hands with soap and rinsing with pure water.

For the portions of the patient's body that have been injured or are the seat of operative procedure:

1. A general bath some time during the twenty-four hours preceding the operation.

2. Soaping and shaving of the field of operation.

3. Rinsing the same with boiled water.

4. Brushing or rubbing the same with ether.

5. Rinsing with boiled water.

6. Brushing or rubbing with sublimate solution 1 to 2000, or lactate of silver solution 1 to 1000.

7. Rinsing with boiled water.

8. Covering the neighborhood of the field of operation with linen cloths which have lain in sublimate water 1 to 2000 for ten minutes immediately before the operation, or which have been boiled.

9. During and after the operation protective cleansing of the field of operation with 1 to 2000 sublimate, or 1 to 1000 lactate of silver solution.

10. Cavities are to be irrigated with 1 to 500-2000 lactate of silver, or 1 to 4000 citrate of silver solution.

4. TREATMENT OF WOUNDS. Operative Wounds.

After the cleansing of the field the operation is performed, and several times if it is particularly bloody or dirty, and in every case at its conclusion, a gentle rinsing with 1 to 2000 sublimate or 1 to 2000-5000 solution of the lactate or the citrate of silver is done. The sublimate solution is most convenient in places, as in hospitals, where an antiseptic solution is frequently used, and a stable fluid must be kept on hand. The silver salts decompose under the influence of light, and must always be prepared fresh; with the help of the tablets this can very readily be done. After haemostasis the wound should be lightly dusted with the powdered citrate of silver; even the omentum stands this very well. The wound is then dressed with gauze, or silver gauze and cotton, and bandaged somewhat tightly. The dress-

ings remain in place as a rule for eight to ten days. They do not require to be renewed when serum trickles through them, but they should be covered with new dressings for appearance sake. Contact of the secretion with the air does no harm. When inflammatory processes are present it is proper to use a wet dressing for the first two or three days after the insufflation of the citrate of silver, and then to apply a dry one. On changing the dressings ordinary cleanliness only is usually required.

INJURIES.

Attended with Hemorrhage.

When possible the patient should be first bathed; when this is not practicable the neighborhood of the wound should be cleansed according to the above rules. No minute examination of the wound should be undertaken; only portions of tissue that are almost entirely detached should be cut away; and nothing should be removed from the surface of the wound even if it is dirty. Incisions are to be made only when there is very great undermining. Sutures are not to be applied, or used only for the purpose of maintaining the parts in opposition. After hemostasis is effected the powdered citrate of silver is thinly dusted over the wound. If the parts have been badly contused, or if inflammation has already set in, a water dressing is applied; in other cases the dressing should be dry, as for operative wounds. Care must be taken to secure a quiet and firm position for the affected part. The wound and its immediate neighborhood soon become aseptic, as is seen from the purely serous secretion that appears; and they remain so, for the citrate of silver infiltrates the neighboring tissues and sterilizes, without in any way irritating them. Local abscesses may be caused at a distance from the wound by disease organisms; they must be treated in the

usual way. Plastic and other preparations are as a rule done secondarily.

5. TREATMENT OF ULCERS, ABSCESSSES, FISTULAE, SUPPURATING CAVITIES, INFLAMED MUCOSAE, ETC.

The affected area must be cleansed as with wounds. Ulcerated surfaces clean up under usings of the citrate of silver and wet or dry dressings in a few days. Abscesses that have been opened, and suppurating cavities are first irrigated with 1 to 1000-5000 lactate or citrate of silver solutions, and then packed with silver gauze. The deeper layers are to be removed only when granulations have appeared. The mucous membranes bear the silver solutions very well indeed, as also do the serous membranes of the abdominal and the thoracic cavities. The citrate and lactate solutions have at least the same antiseptic value as those of the nitrate of silver, but are not irritating like the latter. Bougies of the citrate of silver may be introduced one to three times a week in chronic fistulae and in cavities and sinuses that are difficult of access. Wet applications of the citrate of silver solution, 1 to 4000, to inflamed parts, more especially in inflammations of the eyelids, have all the efficacy of an active but non-irritating antiseptic. At every change of dressing the neighborhood of the wound is to be thoroughly cleansed by means of baths and rinsings with water or with benzine.

A little practice will enable us to entirely avoid the only disadvantage of the silver treatment, the light brown discolorations of the linen that it occasions. When such do occur they can readily be removed by immersion for two or three minutes in a solution composed of sublimate 10.0 grm. (2 1-2 drachms) and ordinary salt 25.0 grm. (1 oz.) to 2000 grm. (2 quarts), of water, followed by a vigorous rinsing.

Therapeutical Progress.

STUDY OF THE AMERICAN MEDICINAL FLORA.

The sub-commission of the Pan-American Medical Congress appointed to study the medicinal plants of the United States has entered into an association with the Smithsonian Institution for that purpose. The attention of our readers is called to the respective circulars issued by these organizations, which we print below.

Smithsonian Institution, Washington, D. C. May 28, 1897.

Dear Sir—The Smithsonian Institution has undertaken to bring together all possible material bearing on the medicinal uses of plants in the United States. Arrangements have been made with a body representing the Pan-American Medical Congress, the sub-commission on medical flora of the United States, to elaborate a report on this subject, and the material when received will be turned over to them for investigation.

The accompanying detailed instructions relative to specimens and notes have been prepared by the sub-commission.

All packages and correspondence should be addressed to the Smithsonian Institution, Washington, D. C., and marked on the outside, "Medicinal Plants for the United States National Museum."

Franks which will carry specimens, when of suitable size, together with descriptions and notes, free of postage through the mails, will be forwarded upon application. Should an object be too large for transmission by mail the sender is requested, before shipping it, to notify the Institution, in order that a proper au-

thorization for its shipment may be made out. Respectfully,
(Signed) S. P. LANGLEY,

Secretary.

INSTRUCTIONS RELATIVE TO MEDICINAL PLANTS.

The Pan-American Medical Congress, at its meeting, held in the City of Mexico, in November, 1896, took steps to institute a systematic study of the American medicinal flora, through the medium of a general commission and of special sub-commissions, the latter to be organized in the several countries. The sub-commission for the United States has been formed and consists of Dr. Valery Havard, U. S. A., chairman; Mr. Frederick V. Coville, botanist of the U. S. Department of Agriculture; Dr. C. F. Millspaugh, curator of the Botanical Department of the Field Columbian Museum, Chicago; Dr. Charles Mohr, State Botanist of Alabama; Dr. W. P. Wilson, director of the Philadelphia Commercial Museums, and Professor H. H. Rusby, of the New York College of Pharmacy. This sub-commission solicits information concerning the medicinal plants of the United States from everyone in a position to accord it. The principal points of study are as follows:

1. Local names.
2. Local uses, together with historical facts.
3. Geographical distribution and degree of abundance in the wild state.
2. Is the plant collected for market, and if so,
 - (a) At about what season of the year?
 - (b) To how great an extent?
 - (c) How prepared for market?

(d) What is the effect of such collection upon the wild supply?

(e) What price does it bring?

(f) Is the industry profitable?

5. Is the plant, or has it ever been, cultivated, and if so give all information on the subject, particularly as to whether such supplies are of superior quality, and whether the industry has not proved profitable.

6. If not cultivated present facts concerning the life history of the plant which might aid in determining methods of cultivation.

7. Is the drug subjected to substitution or adulteration? and if so give information as to the plants used for this purpose.

While it is not expected that many persons will be able to contribute information on all these points concerning any plant, it is hoped that a large number of persons will be willing to communicate such partial knowledge as they possess.

It is not the important or standard drugs alone concerning which information is sought. The sub-commission desires to compile a complete list of the plants which have been used medicinally, however trivial such use may be. It also desires to collect all obtainable information, historical, scientific and economic, concerning our native and naturalized plants of this class, and to that end invites the co-operation of all persons interested. Poisonous plants of all kinds come within the scope of our inquiry, whether producing dangerous symptoms in man or simply skin inflammation, or, as "loco-weeds," deleterious to horses, cattle and sheep. In this respect the general reputation of a plant is not so much desired as the particulars of cases of poisoning actually seen or heard from reliable observers. It is believed that much interesting knowledge can be obtained from Indians, Mexicans and half-breeds, and that, consequently, Indian agencies and reservations are particularly favorable fields for our investigation. Such knowledge will be most acceptable when based upon known facts or experiments.

In order to assist in the study of the habits, properties and uses of

medicinal plants, the sub-commission undertakes to furnish the name of any plant specimen received, together with any desired information available.

Owing to the diversity in the common names of many plants it will be necessary for reports, when not furnished by botanists or others qualified to state the botanical names with certainty, to accompany the same with some specimen of the plant sufficient for its identification. While the sub-commission will endeavor to determine the plant from any portion of it which may be sent, it should be appreciated that the labor of identification is very greatly decreased and its usefulness increased, by the possession of complete material; that is, leaf, flower and fruit, and in the case of small plants the underground portion also. It is best to dry such specimens thoroughly in a flat condition under pressure before mailing. While any convenient means for accomplishing this result may be employed, the following procedure is recommended: Select a flowering or fruiting branch, as the case may be, which when pressed shall not exceed 16 inches in length by 10 inches in width. If the plant be an herb two or three feet high it may be doubled to bring it within these measurements. If it possess root leaves some of these should be included. Lay the specimen flat in a fold of newspaper and place this in a pile of newspapers, carpet felting or some other form of paper which readily absorbs moisture and place the pile in a dry place under a pressure of about 20 to 30 pounds, sufficient to keep the leaves from wrinkling as they dry. If a number of specimens are pressed at the same time each is to be separated from the others by three or four folded newspapers or an equivalent in other kinds of paper. In 12 to 24 hours these papers will be found saturated with the absorbed moisture, and the fold containing the specimen should be transferred to dry ones. This change should be repeated for from two to five days according to the state of the weather, the place where the drying is done, the fleshiness of the specimens, etc.

The best way to secure the required pressure is by means of a pair of strong straps, though weights will do. The best place for drying is beside a hot kitchen range. When dry the specimens should be mailed between cardboards or some other light but stiff materials which will not bend in transit.

It is a most important matter that the name and address of the sender should be attached to the package and that the specimens, if more than one, should be numbered, the sender retaining also specimens bearing the same number, to facilitate any correspondence which may follow. The sub-commission requests that, so far as practicable, all plants sent be represented by at least four specimens.

(Signed) H. H. RUSBY, M. D.,
Chairman of the General Commission, New York College of Pharmacy.

VALÉRY HAVARD, M. D.,
Chairman of the Sub-Commission,
Fort Slocum, David's Island,
New York.

OPIUM IN GRAVE DISEASE.

Mr. Greig Smith, in a paper on the "Pre-Diagnostic Treatment of Grave Abdominal Disease" (Treatment, March 25, 1897) urges the desirability of avoiding the use of opium in these cases. He does not mention purgatives, but he advises the avoidance of iced fruits on the ground that by their administration the intestines may be "started into furious action." A course of treatment is sought for "which will certainly do no harm, but will probably do good, and which will not obscure the signs

and symptoms, but will rather help in their evolution and interpretation." Assuming that a patient has symptoms coming on suddenly which may be due to simple colic or to "some grave condition such as obstruction or perforation of a viscus, or even extravasation of blood," he advises as the first thing to be done the administration of brandy in milk by the rectum, and that the patient should then be swathed in hot blankets. "The attendant now sits down by the bedside of the patient to watch him and complete the diagnosis. And he ought scarcely to leave his side till the diagnosis is complete." Mr. Greig Smith goes on to say that the patient with the colic makes a great fuss about his condition, whereas the subject of grave disease makes little fuss and keeps his abdomen as still as possible. If the intestines are in motion Mr. Greig Smith considers that there is no perforation, because this condition causes paralysis and silence on auscultation, except at the seat of rupture, where there are "rare and mysterious blowing or rushing sounds." He then briefly refers to the signs of gaseous exudation into the peritoneal cavity. If the surgeon notes and keeps in mind every individual sign as it is evolved, Mr. Greig Smith says, "it will be surprising if at the end of half an hour their aggregation do not permit of a diagnosis being made sufficiently accurate for exact treatment," and if it be decided that the condition is due to colic he advises that the treatment should commence with a full dose of morphia. But here we get beyond the pre-diagnostic stage.

—Practioner.

